Application No.: 09/837769 Docket No.: SYCS-007

REMARKS

Claims 1-20 were presented for examination. No claims have been added or amended. No new matter has been added. Claims 1-20 are now pending. Claims 1, 8, and 15 are independent.

Rejections Pursuant to 35 U.S.C. §103(a)

The Examiner rejected claims 1-3, 6, and 8-20 as being rendered obvious by Swanson et al (United States Patent Number 6,580,531, hereafter "Swanson"), in view of Itou et al (United States Patent Number 5,822,112, hereafter "Itou"). For the reasons set forth below, Applicants respectfully traverse this rejection.

Swanson discloses an invention relating to in-circuit biasing of a modulated laser and bit error rate testing of an optical transmitter and/or optical receiver under the control of a test controller. (See Swanson, Abstract). The test controller uses a variable optical attenuator, in combination with an erbium-doped fiber amplifier (EDFA) to control an optical signal to noise ratio for a signal terminating at either the transmitter or the receiver of the optical transceiver under test. (See Swanson, Abstract). The optical amplifier 28 in Swanson (an erbium doped fiber amplifier) must be used in combination with the first variable optical attenuator to produce a desired optical signal to noise ratio. (See Swanson, col. 4, lines 59-60). The output of the optical amplifier 28 is coupled to a second optical splitter, which passes a portion to a wave meter and a second portion to a tunable optical filter. (See Swanson, col. 4, lines 63-67).

Itou discloses an invention relating suppressing overshooting of ALC control at power on and at the time of input light restoration from an off condition, while ensuring quick starting. (See Itou, Abstract). Itou provides a control apparatus for an optical amplifier such as an erbium-doped optical-fiber (EDF) amplifier, the apparatus suppressing overshooting of ALC control. (See Itou, Abstract). The control apparatus for an optical amplifier comprises an automatic level controller for controlling power of pumping light supplied to the optical amplifier to maintain output power of the optical amplifier at a constant power level. (See Itou, col. 1, lines 61-65).

The Examiner rejected claim 1 as being unpatentable over Swanson. Claim 1 includes the element of an optical noise loading amplifier, which applies noise to the optical network, or through an attenuator, which attenuates the signal to adjust the SNR from the noise loading amplifier (see claim 1). Swanson fails to teach or suggest applying the output of the optical amplifier 28 to the optical network either directly or through an attenuator, and thus fails to render obvious the subject matter of claim 1. In contrast to the claimed invention, where output is applied from a noise loading amplifier to the optical network, Swanson requires the output of the optical amplifier 28 to go not to the optical network but instead to pass through a series of three optical splitters to a wave meter and a power meter. (See Swanson, col. 4, lines 64-67 and col. 5, lines 1-8). Applying optical amplifier output to a series of optical splitters, a power meter, and a wave meter does not teach or suggest injecting or loading noise into the optical network, directly or through an attenuator. Therefore, Swanson does not teach or suggest the claimed invention.

Claim 1 also includes the element of an optical attenuator connected in series with the optical noise loading amplifier for receiving the signals to be applied to the noise loading amplifier and for attenuating the signal to adjust the signal to noise ratio of output from the noise loading amplifier. (See claim 1). Swanson fails to teach or suggest the claimed element since Swanson fails to disclose an optical attenuator connected in series with the optical noise injection/loading amplifier.

The optical noise loading amplifier of the claimed invention is configured to output at a fixed power level. (See claim 1). Swanson fails to teach or suggest that the amplifier is configured to output at a fixed power level. The Examiner admits that Swanson fails to teach or suggest this configuration. (See Current Office Action, Page 3). However, the Examiner states that adjusting the output power level of the optical amplifier to be at a fixed level is well known and states that Itou teaches a method of maintaining output power of an optical amplifier at a constant or fixed power level. (See Current Office Action, Page 3). As noted above, the optical amplifier of Swanson does not teach or suggest the optical noise loading amplifier of the claimed invention, nor does Itou teach an optical noise loading amplifier, only a method of maintaining output power of an optical amplifier. Therefore, the combination of Swanson and Itou cannot

teach or suggest configuring the output of the optical noise loading amplifier of the claimed invention.

The Examiner rejected claim 2 as being unpatentable over Swanson. Claim 2 includes the element of a second optical attenuator for adjusting power of the output for the noise loading amplifier to an appropriate level for a receiver (See claim 2). Swanson fails to teach or suggest a second optical attenuator adjusting power of the output for the noise loading amplifier.

In the claimed invention, the second optical attenuator adjusts power of the output for the noise loading amplifier to an appropriate level for a receiver. (See claim 2). In Swanson, the second optical signal splitter 44 passes a second portion of the received optical signal to a tuneable optical filter 32, which is coupled to the input of the second variable optical attenuator 34 via an optical fiber. (See Swanson, col. 4, lines 65-68, and col. 5, lines 1-2). The output of the second variable optical attenuator 34 is coupled to a third optical splitter 46, which is coupled to an optical power meter 36 and to the reference receiver 48 within the pre-qualified transceiver 50 via the optical switch 40. (See Swanson, col. 5, lines 2-11). The second variable optical attenuator 34 in Swanson receives only a portion of the optical signal and must receive it via a tuneable optical filter and optical signal splitter. (See Swanson, col. 4, lines 65-68). In contrast, the optical attenuator in the claimed invention does not require the receipt of the optical signal from an optical signal splitter or a tuneable optical filter and the optical attenuator is not limited to receiving only a portion of the optical signal. Since Swanson does not teach an optical attenuator adjusting power of the output for the noise loading amplifier, but rather discusses an optical attenuator receiving a portion of an optical signal and sending it to an optical splitter, power meter and reference receiver, Swanson fails to teach or suggest the claimed invention.

The Examiner rejected claim 3 as being unpatentable over Swanson. Claim 3 includes the element of an optical attenuator which is tunable (See claim 3). As discussed above, Swanson fails to teach or suggest the optical attenuator of claim 1. Therefore, Swanson fails to teach or suggest the optical attenuator of claim 1, which is tunable.

The Examiner rejected claim 6 as being unpatentable over Swanson. Claim 6 includes the element of a one-stage noise-loading amplifier, which is operated at constant output power. (See claim 6). Swanson fails to teach or suggest the one-stage noise-loading amplifier of claim

6. The Examiner states that Swanson does not disclose an optical amplifier that is configured to output at a fixed power level. (See Current Office Action, page 4). However, the Examiner states that Itou teaches a method of maintaining output power of an optical amplifier at a constant or fixed power level, and therefore, that it would have been obvious to one of ordinary skill in the art to control the optical amplifier of Swanson to output a fixed power level as taught by Itou.

Claim 6 includes the element of a one-stage noise-loading amplifier. Swanson fails to teach or suggest a one-stage noise-loading amplifier. The optical amplifier in Swanson must operate in combination with the first variable optical attenuator to produce a desired optical signal to noise ratio. (See Swanson, col. 4, lines 59-60). The one-stage noise-loading amplifier of the claimed invention does not require operation in combination with an optical attenuator. Additionally, the one-stage noise-loading amplifier in the claimed invention creates noise, which is added to an optical test signal. The Swanson optical amplifier does not create noise to be added to an optical test signal. Since Swanson does not teach or suggest a one-stage noise-loading amplifier creating noise to be added to an optical test signal, Swanson fails to teach or suggest the claimed invention. Itou discusses maintaining output power but does not teach or suggest an optical amplifier. Maintaining output power of the Swanson optical amplifier does not teach or suggest a one-stage noise-loading amplifier operated at constant output power. The combination of Itou and Swanson therefore fails to teach or suggest the claimed invention.

The Examiner rejected claim 8 as being unpatentable over Swanson. Claim 8 includes the elements of an optical network, a transmitter for applying a test signal to the optical network, and a noise loading circuit. (See claim 8). The noise loading circuit includes an optical noise loading amplifier for applying noise to the optical network. (See claim 8). Swanson fails to teach or suggest the claimed optical noise loading amplifier since Swanson fails to teach or suggest an optical noise loading amplifier applying noise to an optical network.

The Examiner states that it is well known that optical amplifiers produce noise such as ASE noise, and therefore that since the optical amplifier is in the transmission line, noise generated by the optical amplifier in Swanson is injected/loaded onto the signal. (See Current Office Action, page 5). Claim 8 includes the element of an optical noise loading amplifier,

which applies noise to the optical network, or through an attenuator, which attenuates the signal to adjust the SNR from the noise loading amplifier (see claim 8). Swanson fails to apply the output of the optical amplifier 28 to the optical network, either directly or through an attenuator. The optical amplifier 28 (an erbium doped fiber amplifier) must be used in combination with the first variable optical attenuator to produce a desired optical signal to noise ratio. (See Swanson, col. 4, lines 59-60). The output of the optical amplifier 28 is coupled to a second optical splitter, which passes a portion to a wave meter and a second portion to a tuneable optical filter. (See Swanson, col. 4, lines 63-67). In contrast to the claimed invention, where output is applied from a noise loading amplifier to the optical network, Swanson discusses the output of the optical amplifier 28 going not to the optical network but instead passing through a series of three optical splitters to a wave meter and a power meter. (See Swanson, col. 4, lines 64-67 and col. 5, lines 1-8). Applying optical amplifier output to a series of optical splitters, a power meter, and a wave meter does not teach or suggest injecting or loading noise into the optical network, directly or through an attenuator. Therefore, Swanson does not teach or suggest the claimed invention.

Claim 8 also includes the element of an optical attenuator connected in series with the optical noise loading amplifier for receiving the signals to be applied to the noise loading amplifier and for attenuating the signal to adjust the signal to noise ratio of output from the noise loading amplifier. (See claim 8). Swanson fails to teach or suggest the claimed element since Swanson fails to disclose an optical attenuator connected in series with the optical noise injection/loading amplifier.

The Examiner states that Swanson teaches an optical attenuator 26 and an optical noise injection/loading amplifier 28 since Swanson discloses that the combination of the variable attenuator and the optical amplifier operates to produce a desired signal to noise ration. (See Current Office Action, page 5). In Swanson, the optical amplifier 28 operates in combination with the first variable optical attenuator to produce the desired optical signal to noise ratio. (See Swanson, col. 4, line 56-60). The optical amplifier 28 fails to attenuate the signal to adjust the signal to noise ratio of output from the amplifier because, in Swanson, the optical amplifier 28 and the optical attenuator 26 must operate in combination to produce the desired optical signal to noise ratio. (See Swanson, col. 4, line 56-60). In contrast, the optical attenuator in the claimed

invention may attenuate the signal, without requiring operation in combination with the optical noise loading amplifier. (See claim 8).

Claim 8 also includes the element of the optical amplifier being configured to output at a fixed power level. The optical noise loading amplifier of the claimed invention is configured to output at a fixed power level. (See claim 8). Swanson fails to disclose that the amplifier is configured to output at a fixed power level. The Examiner admits that Swanson fails to disclose this configuration. (See Current Office Action, Page 5). However, the Examiner states that adjusting the output power level of the optical amplifier to be at a fixed level is well known and states that Itou teaches a method of maintaining output power of an optical amplifier at a constant or fixed power level. (See Current Office Action, Page 5-6). As noted above, the optical amplifier of Swanson does not teach or suggest the optical noise loading amplifier of the claimed invention, nor does Itou teach an optical noise loading amplifier, only a method of maintaining the output power of an optical amplifier. Therefore, the combination of Swanson and Itou cannot teach or suggest configuring the output of the optical noise loading amplifier of the claimed invention.

The system in claim 8 includes the element of an optical network. (See claim 8). Swanson and Itou fail to disclose an optical network. The Examiner admits that Swanson and Itou fail to disclose an optical network. (See Current Office Action, page 6). However, since the system can be used in an optical switch network, the Examiner states that it would be obvious to incorporate the optical system of Swanson into an optical network. (See Current Office Action, page 6). Since, as discussed above, Swanson and Itou fail to teach or suggest each and every element of the claimed invention, even combined, they fail to teach or suggest the use of the claimed invention in an optical network.

The system in claim 8 includes the element of a transmitter. (See claim 8). Swanson fails to teach or suggest the use of a transmitter. The Examiner admits that Swanson fails to disclose transmitting a test signal. The Examiner states that Swanson discloses testing the optical system and that it would be obvious that the invention was made to transmit a test signal. (See Current Office Action, page 6). Swanson does not teach or suggest the use of a transmitter to apply a test signal. Even if, as the Examiner suggests, Swanson discloses an invention made

to transmit a test signal, that does not teach or suggest a system including an optical network, a noise loading circuit and a transmitter for applying a test signal to the optical network. No reference is made to using a transmitter in Swanson, and since Swanson does not teach or suggest an element of a transmitter, Swanson fails to teach or suggest the transmitter in the claimed invention.

The Examiner rejected claim 13 as being unpatentable over Swanson. Claim 13 includes the element of a second optical attenuator for adjusting output from the noise loading amplifier to an appropriate power level for the receiver (See claim 13). Swanson fails to teach or suggest a second optical attenuator adjusting the output from the noise loading amplifier.

The Examiner states that Swanson shows a second optical attenuator 34 for adjusting power of the output for the noise injection/loading amplifier to an appropriate level for a receiver. In the claimed invention, the second optical attenuator adjusts the output from the noise loading amplifier to an appropriate power level for the receiver. (See claim 13). In Swanson, the second optical signal splitter 44 passes a second portion of the received optical signal to a tuneable optical filter 32, which is coupled to the input of the second variable optical attenuator 34 via an optical fiber. (See Swanson, col. 4, lines 65-68, and col. 5, lines 1-2). The output of the second variable optical attenuator 34 is coupled to a third optical splitter 46, which is coupled to an optical power meter 36 and to the reference receiver 48 within the pre-qualified transceiver 50 via the optical switch 40. (See Swanson, col. 5, lines 2-11). The second variable optical attenuator 34 in Swanson receives only a portion of the optical signal and must receive it via a tuneable optical filter and optical signal splitter. (See Swanson, col. 4, lines 65-68). In contrast, the optical attenuator in the claimed invention does not require the receipt of the optical signal from an optical signal splitter or a tuneable optical filter and the optical attenuator is not limited to receiving only a portion of the optical signal. Since Swanson does not teach an optical attenuator adjusting the output for the noise loading amplifier, but rather discusses an optical attenuator receiving a portion of an optical signal and sending it to an optical splitter, power meter and reference receiver, Swanson fails to teach or suggest the claimed invention.

The Examiner rejected claim 15 as being unpatentable over Swanson. Claim 15 discusses a method of testing an optical network, including the step of providing a noise loading

circuit in an optical network. (See claim 15). The noise loading circuit includes an optical noise loading amplifier for adding noise to the optical network and an optical attenuator for attenuating input signal power of input to the optical noise loading amplifier. (See claim 15). Swanson fails to teach or suggest testing an optical system by providing a noise loading circuit since Swanson fails to disclose a noise loading circuit comprising the elements of the claimed invention, including an optical noise loading amplifier.

The Examiner states that it is well known that optical amplifiers produce noise such as ASE noise, and therefore that since the optical amplifier is in the transmission line, noise generated by the optical amplifier in Swanson is injected/loaded onto the signal. (See Current Office Action, page 8). Claim 15 includes the element of an optical noise loading amplifier, which applies noise to the optical network, or through an attenuator, which attenuates the signal to adjust the SNR from the noise loading amplifier (see claim 15). Swanson fails to apply the output of the optical amplifier 28 to the optical network, either directly or through an attenuator. The optical amplifier 28 (an erbium doped fiber amplifier) must be used in combination with the first variable optical attenuator to produce a desired optical signal to noise ratio. (See Swanson, col. 4, lines 59-60). The output of the optical amplifier 28 is coupled to a second optical splitter, which passes a portion to a wave meter and a second portion to a tuneable optical filter. (See Swanson, col. 4, lines 63-67). In contrast to the claimed invention, where output is applied from a noise loading amplifier to the optical network, Swanson discusses the output of the optical amplifier 28 going not to the optical network but instead passing through a series of three optical splitters to a wave meter and a power meter. (See Swanson, col. 4, lines 64-67 and col. 5, lines 1-8). Applying optical amplifier output to a series of optical splitters, a power meter, and a wave meter does not teach or suggest injecting or loading noise into the optical network, directly or through an attenuator. Therefore, Swanson does not teach or suggest the claimed invention.

Claim 15 also includes the element of an optical attenuator connected in series with the optical noise loading amplifier for receiving the signals to be applied to the noise loading amplifier and for attenuating the signal to adjust the signal to noise ratio of output from the noise loading amplifier. (See claim 15). Swanson fails to teach or suggest the claimed element since Swanson fails to disclose an optical attenuator connected in series with the optical noise injection/loading amplifier. The Examiner states that Swanson teaches an optical attenuator 26

and an optical noise injection/loading amplifier 28 since Swanson discloses that the combination of the variable attenuator and the optical amplifier operates to produce a desired signal to noise ration. (See Current Office Action, page 8).

In Swanson, the optical amplifier 28 operates in combination with the first variable optical attenuator to produce the desired optical signal to noise ratio. (See Swanson, col. 4, line 56-60). The optical amplifier 28 fails to attenuate the signal to adjust the signal to noise ratio of output from the amplifier because, in Swanson, the optical amplifier 28 and the optical attenuator 26 must operate in combination to produce the desired optical signal to noise ratio. (See Swanson, col. 4, line 56-60). In contrast, the optical attenuator in the claimed invention may attenuate the signal, without requiring operation in combination with the optical noise loading amplifier. (See claim 15).

Claim 15 includes the steps of setting the optical attenuator to a first level of attenuation; calculating a first measurement of a performance metric; setting the optical attenuator to a second level of attenuation; and calculating a second measurement of a performance metric. Swanson fails to teach or suggest these steps. The Examiner states that Swanson shows setting the first variable optical attenuator to a first level of attenuation. However, in Swanson, two variable optical attenuators are required. The test controller 14 must set the first variable optical attenuator to minimum attenuation and the second variable optical attenuator must be set to a predetermined maximum necessary to prevent damage to the reference receiver. (See Swanson, col. 9, lines 62-64). In the claimed invention, only one optical attenuator is required. Therefore, Swanson does not teach or suggest the step of setting the first optical attenuator to a second level of attenuation since Swanson sets the second level on the second optical attenuator. Nor does Swanson teach or suggest calculating a first measurement after setting the optical attenuator to a first level of attenuation because in Swanson, the first measurement is determined prior to setting the optical attenuators. Since Swanson does not teach or suggest setting the optical attenuator to both a first and second level of attenuation and completing the claimed steps through the use of a single optical attenuator, Swanson fails to teach or suggest the claimed invention.

Claim 15 also includes the element of the noise loading optical amplifier configured to wave a constant output power. (See claim 15). Swanson fails to disclose an amplifier that is

configured to wave a constant output power. The Examiner admits that Swanson fails to disclose this configuration. (See Current Office Action, Page 9). However, the Examiner states that adjusting the output power level of the optical amplifier to be at a fixed level is well known and states that Itou teaches a method of maintaining output power of an optical amplifier at a constant or fixed power level. (See Current Office Action, Page 9-10). As noted above, the optical amplifier of Swanson does not teach or suggest the optical noise loading amplifier of the claimed invention, nor does Itou teach an optical noise loading amplifier, only a method of maintaining the output power of an optical amplifier. Therefore, the combination of Swanson and Itou cannot teach or suggest configuring the output of the optical noise loading amplifier of the claimed invention.

The system in claim 15 includes the element of an optical network. (See claim 15). Swanson and Itou fail to disclose an optical network. The Examiner admits that Swanson and Itou fail to disclose an optical network. (See Current Office Action, page 10). However, since the system can be used in an optical switch network, the Examiner states that it would be obvious to incorporate the optical system of Swanson into an optical network. (See Current Office Action, page 10). Since, as discussed above with respect to the noise loading circuit and the steps described in claim 15, Swanson and Itou fail to teach or suggest each and every element of claim 15, even combined, they fail to teach or suggest the use of the claimed invention in an optical network.

The Examiner admits that Swanson fails to disclose transmitting a test signal. (See Current Office Action, page 10. However, claim 15 does not include the element of a transmitter. (See claim 15). Therefore, although Swanson fails to disclose transmitting a test signal, this rejection does not apply to claim 15.

The Examiner rejected claims 17 and 18 as unpatentable over Swanson. Claim 17 includes the element of the optical attenuator being set to the first level of attenuation to achieve a first optical signal to noise ratio. (See claim 17). Claim 18 includes the element of the optical attenuator being set to the second level of Swanson fails to teach or suggest an optical attenuator set to a second level of attenuation to achieve a second optical signal to noise ratio. (See claim 17). Swanson fails to teach or suggest using a single optical attenuator set to both a first and

second level of attenuation to achieve a first and second optical signal to noise ratio. As discussed with respect to claim 15, Swanson requires two variable optical attenuators and fails to teach or suggest the use of a single optical attenuator. Therefore, Swanson fails to teach or suggest setting two levels of attenuation on a single optical attenuator and achieving two optical signal to noise ratios on a single optical attenuator.

The Examiner rejected claim 20 as unpatentable over Swanson. Claim 20 includes the step of attenuating output from the optical noise loading amplifier. As discussed above with respect to claim 15, Swanson fails to teach or suggest the claimed optical noise loading amplifier. Therefore, since Swanson does not teach or suggest the element of the optical noise loading amplifier, Swanson fails to teach or suggest attenuating output from that element.

The Examiner rejected claims 4, 5, and 7 under §103 as unpatentable over Swanson. Claim 4 includes the steps of transmitting an optical test signal to the optical network; attenuating channel power to the optical test signal; adding noise to the optical test signal; and calculating the BER based on the optical test signal received at the receiver. (See claim 4). Swanson fails to teach or suggest the step of adding noise to the optical signal. Swanson fails to apply the output of the optical amplifier 28 to the optical network, either directly or through an attenuator. The optical amplifier 28 (an erbium doped fiber amplifier) must be used in combination with the first variable optical attenuator to produce a desired optical signal to noise ratio. (See Swanson, col. 4, lines 59-60). The output of the optical amplifier 28 is coupled to a second optical splitter, which passes a portion to a wave meter and a second portion to a tuneable optical filter. (See Swanson, col. 4, lines 63-67). Swanson discusses the output of the optical amplifier 28 going not to the optical network but instead passing through a series of three optical splitters to a wave meter and a power meter. (See Swanson, col. 4, lines 64-67 and col. 5, lines 1-8). Applying optical amplifier output to a series of optical splitters, a power meter, and a wave meter does not teach or suggest injecting or loading noise into the optical network, directly or through an attenuator. Therefore, Swanson does not teach or suggest the claimed invention.

Claim 5 includes the element of a one-stage noise loading amplifier creating the noise added to the optical test signal. Swanson fails to teach or suggest a one-stage noise-loading amplifier. The optical amplifier in Swanson must operate in combination with the first variable

optical attenuator to produce a desired optical signal to noise ratio. (See Swanson, col. 4, lines 59-60). The one-stage noise-loading amplifier of the claimed invention does not require operation in combination with an optical attenuator. Additionally, the one-stage noise-loading amplifier in the claimed invention creates noise, which is added to an optical test signal. The Swanson optical amplifier does not create noise to be added to an optical test signal. Since Swanson does not teach or suggest a one-stage noise-loading amplifier creating noise to be added to an optical test signal, Swanson fails to teach or suggest the claimed invention.

Claim 7 includes the method of claim 4 where the step of attenuating is done to establish a given optical signal noise ratio. As discussed with respect to claim 4, Swanson fails to disclose each and every element of the method in claim 4. Therefore, Swanson fails to teach or suggest the purpose of claim 7, attenuating to establish a given optical signal noise ratio.

Applicants further contend that the dependent claims are non-obvious as the claims are non-obvious combinations with the subject matter of independent claims 1, 8, and 15.

Accordingly, since Swanson and Itou fail to teach or suggest each and every element of claims 1-20, Applicants request the withdrawal of the rejections and the allowance of the claims.

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Conclusion

In view of the above remarks, Applicants believe the pending application is in condition for allowance.

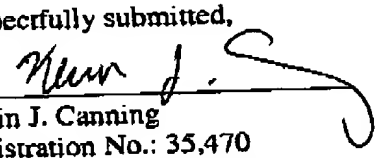
Applicants have reviewed the art made of record but not relied upon and believe that the pending claims are patentable over this art.

Should the Examiner feel that a telephone conference would expedite prosecution of this application, the Examiner is urged to contact the Applicants' attorney at the undersigned telephone number.

Applicants believe no fee is due with this statement. However, if a fee is due, please charge our Deposit Account No. 12-0080, under Order No. SYCS-007 from which the undersigned is authorized to draw.

Dated: December 15, 2004

Respectfully submitted,

By 

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